



**Advanced Power
Electronics Corp.**

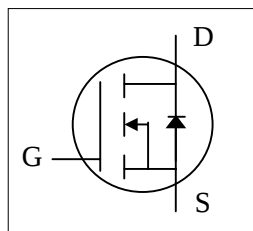
AP9978GP

RoHS-compliant Product

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

- ▼ Simple Drive Requirement
- ▼ Lower On-resistance
- ▼ Fast Switching Characteristic

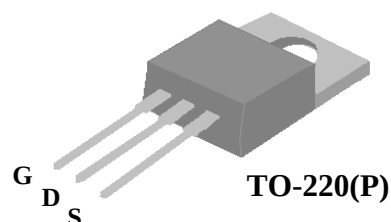


BV_{DSS}	60V
$R_{DS(ON)}$	10m Ω
I_D	75A

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 package is widely preferred for commercial-industrial through-hole applications.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	+20	V
$I_D@T_C=25^{\circ}\text{C}$	Continuous Drain Current, V_{GS} @ 10V	75	A
$I_D@T_C=100^{\circ}\text{C}$	Continuous Drain Current, V_{GS} @ 10V	49	A
I_{DM}	Pulsed Drain Current ¹	270	A
$P_D@T_C=25^{\circ}\text{C}$	Total Power Dissipation	113.6	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
R_{thj-c}	Maximum Thermal Resistance, Junction-case	1.1	$^{\circ}\text{C}/\text{W}$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient	62	$^{\circ}\text{C}/\text{W}$



AP9978GP

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =40A	-	-	10	mΩ
		V _{GS} =4.5V, I _D =30A	-	-	16	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	-	3	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =30A	-	56	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V	-	-	25	uA
I _{GSS}	Gate-Source Leakage	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Q _g	Total Gate Charge ²	I _D =30A	-	33	53	nC
Q _{gs}	Gate-Source Charge	V _{DS} =48V	-	9.3	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =4.5V	-	20	-	nC
t _{d(on)}	Turn-on Delay Time ²	V _{DS} =30V	-	12	-	ns
t _r	Rise Time	I _D =30A	-	50	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =3.3Ω, V _{GS} =10V	-	40	-	ns
t _f	Fall Time	R _D =1Ω	-	80	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	2800	4500	pF
C _{oss}	Output Capacitance	V _{DS} =25V	-	300	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	200	-	pF
R _g	Gate Resistance	f=1.0MHz	-	1.1	1.6	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =40A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time ²	I _S =10A, V _{GS} =0V	-	33	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	46	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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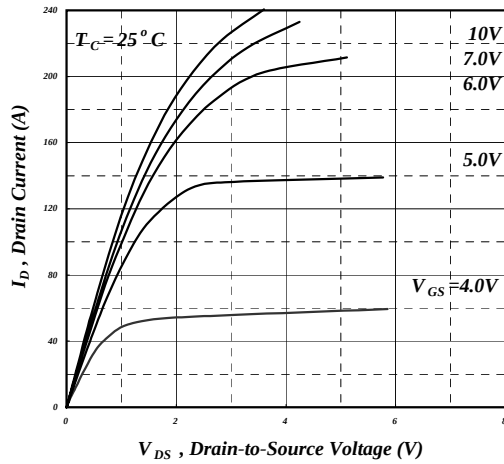


Fig 1. Typical Output Characteristics

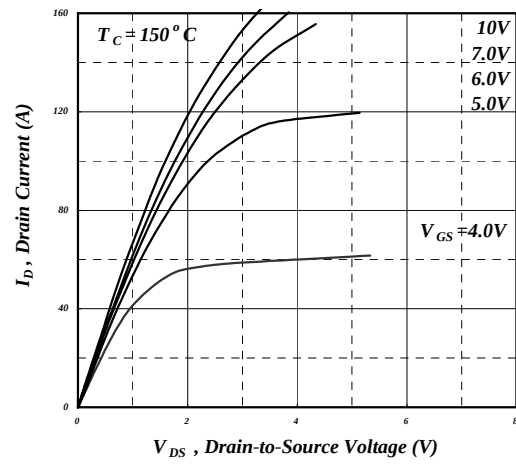


Fig 2. Typical Output Characteristics

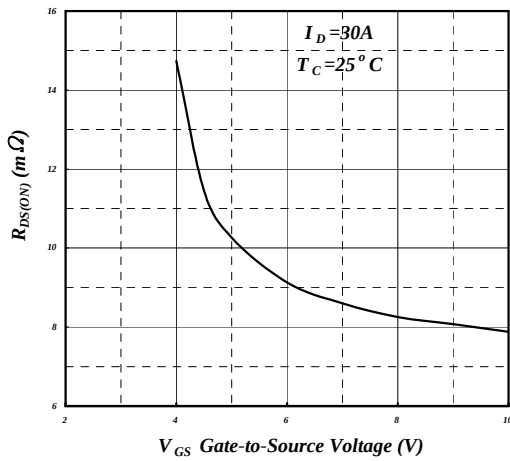


Fig 3. On-Resistance v.s. Gate Voltage

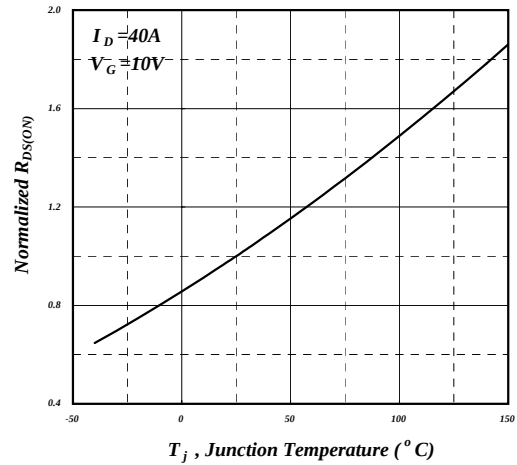


Fig 4. Normalized On-Resistance v.s. Junction Temperature

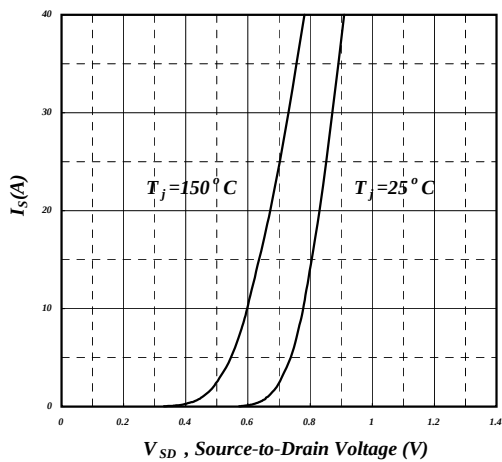


Fig 5. Forward Characteristic of Reverse Diode

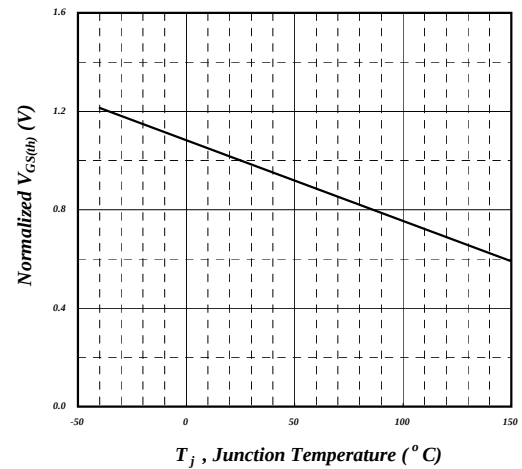


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

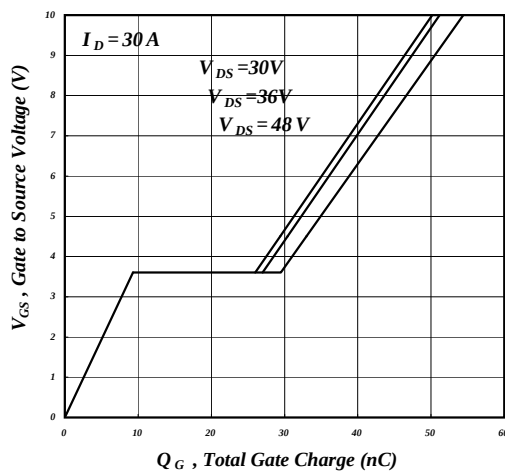


Fig 7. Gate Charge Characteristics

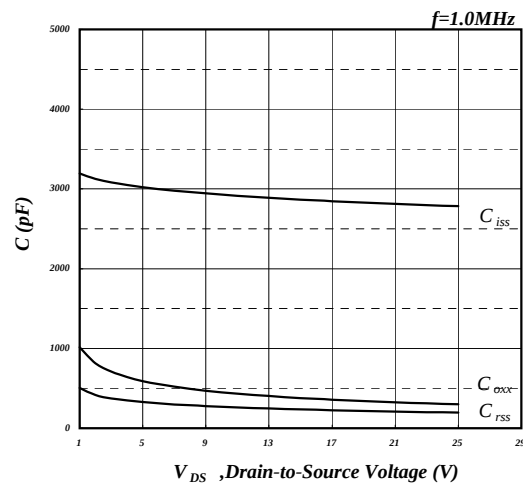


Fig 8. Typical Capacitance Characteristics

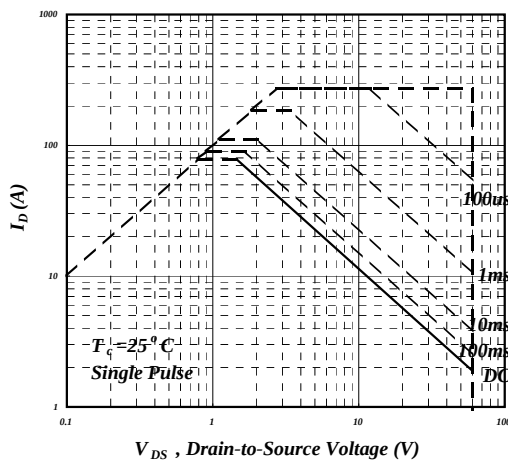


Fig 9. Maximum Safe Operating Area

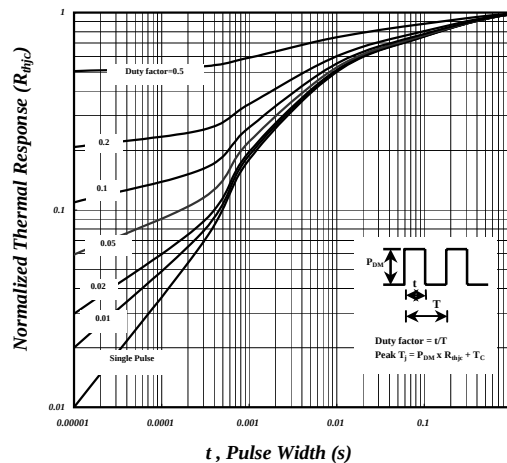


Fig 10. Effective Transient Thermal Impedance

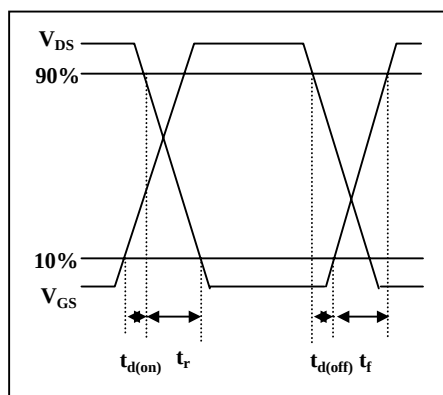


Fig 11. Switching Time Waveform

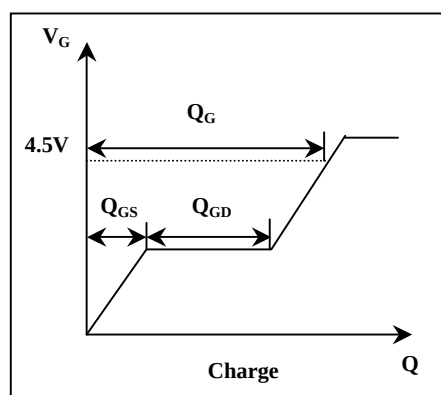


Fig 12. Gate Charge Waveform